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PUCCINIA VERTI-SEPTA, Tracy & Gal.—II and III. Amphigenous; sori prominent, black, round.—II. Spores oval, pale brown, $20-22 \times 23-25 \mu$, epispore thick, slightly roughened.—III. Spores compressed-globose, divided by a distinct vertical septum, thus making each cell short boat-shaped, $28-30 \times 34-35 \mu$; epispore thick, coarsely tuberculate; apex thickened, pedicel very long, variously bent and curved, hyaline. On leaves of *Salvia ballotaeflora*, New Mexico, August.

ÆCIDIUM DRABÆ, Tracy & Gal.—Hypophyllous; æcidia scattered over the entire surface, bright yellow, large, border lacerate or coarsely fringed, spreading; spores globose or oval, greenish-yellow, epispore thick, smooth, $18-21 \times 24-28 \mu$. On leaves of *Draba aurea*, Coolidge, New Mexico, June 20, 1887.

ÆCIDIUM HELIOTROPII, Tracy & Gal.—Amphigenous; spots not large, definite, purplish; æcidia pale yellow circinating, large, very long, the length about four times the diameter, border entire or sometimes lacerate; spores subglobose, epispore thin, minutely roughened, $16-19 \mu$. On leaves and stems of *Heliotropium curassavicum*, Albuquerque, New Mexico, June 17, 1887.

ÆCIDIUM ELLISII, Tracy & Gal.—Amphigenous; spots rather small; æcidia in definite clusters, often circinate, large, surrounded at the base by the ruptured epidermis, which is quite distinct, light orange-yellow, border lacerate; spores subglobose, with numerous vacuoles, epispore thick, slightly roughened, $18-22 \mu$. On leaves of *Chenopodium album*, Albuquerque, New Mexico, June 16, 1887.

ÆCIDIUM LEPIDII, Tracy & Gal.—Spots conspicuous; æcidia prominent, circinating, short, irregularly torn, soon becoming somewhat pulverulent; spores subglobose, epispore thin, $12-14 \mu$. On leaves of *Lepidium montanum*, Utah, July, 1887.

AGARICS OF THE UNITED STATES—GENUS PANUS.

EDWARD J. FORSTER, M. D., BOSTON.

The whole fungus is fleshy-coriaceous, tough, drying up, of fibrous texture, which radiates into the hymenium; gills concrete with the hymenophore, unequal, at length coriaceous, edge quite entire; spores even, white, somewhat cylindrical in species which have been examined. Growing on wood, various in form, lasting long. A genus which must be inserted in this series (between *Lentinus* and *Xerotus*) on account of its flesh, which is pliant and somewhat coriaceous, even in the gills, allied to the *Lentini*, but differing from them in the firmer, coriaceous and very entire gills. Either poisonous or owing to the toughness of the substance not suitable for eating. Fr. Hym. Eur., p. 487, Stevenson, British Fungi, Vol. II, p. 158. Name, *Panus*, a swelling or tumor, given to an arboreal fungus by Pliny, vide Fr. Epicr., p. 396.

The following are all the species (14) which have been described as found in the United States at this time. Fries gives only five of these in his Hym. Europ., viz.: Nos. 1, 2, 5, 6 and 9. *Panus rudis*, B. & C., is given in Sprague's list of New England fungi, but a description was never published, and the name is occupied by Fries, Hym. Eur., p. 489; it may have been a mistake for *Paxillus rudis*, B. & C.

* Pileus irregular, stem excentric, 1, 2, 3, 4.

** Stem definitely lateral, 5, 6, 7, 8, 9.

*** Pileus resupinate, sessile or extended behind, 10, 11, 12, 13, 14.

* 1. PANUS CONCHATUS, Fr.

Pileus 2'—4' broad, cinnamon, then becoming pale, fleshy-pliant, thin, unequal, excentric or dimidiate, flaccid, squamulose when old; stem $\frac{1}{4}$ ' long, $\frac{1}{4}$ " thick, unequal, often compressed, pubescent at the base; gills strongly decurrent in parallel lines by no means anastomosing but here and there branched and unequal, at first whitish or pale flesh color, at length ochraceous wood color, crisped when dry, caespitose, often imbricated and growing into each other. No form is constant. So much allied to *P. torulosus* that the real difference is not apparent. It is thinner, more conchate and more lobed than that species. Stevenson British Fungi, Vol. II, p. 159. Curtis found this in South Carolina, Frost near Amherst, Mass., Johnson in Minnesota, Cragin in Kansas and Morgan on trunks and branches of beech in the Miami Valley, Ohio. Name, *concha*, a shell, shell-shaped.

2. PANUS TORULOSUS, Fr.

Pileus 2'—3' broad, somewhat flesh color, but varying, rufescent-livid and becoming violet, entire, but very excentric, fleshy, somewhat compact when young, plano-infundibuliform, even, smooth; flesh pallid; stem short, commonly 1', solid, oblique, tough, firm, commonly with gray but often violaceous down; gills decurrent, somewhat distant, simple, separate behind, reddish, then tan color. Very changeable in form, at first fleshy-pliant, at length coriaceous. In the covering of the stem it approaches *Paxillus atro-tomentosus*, but there is no affinity between them. On old stumps. Spores 6 x 3 mk. W. G. Stevenson, British Fungi, Vol. II, p. 159. New York, Peck, 30th Rep., p. 44, on oak stumps, in May; Amherst, Mass., C. C. Frost; Kansas, Cragin; Minnesota, Johnson. Name, *torulus*, a tuft of hair, from the hairy down on the stem.

3. PANUS STRIGOSUS, B. & C.

Pileus white, 8 inches across, excentric, clothed with coarse strigose pubescence; margin thin; stem 2—3 inches high, 1 inch or more thick, strigose like the pileus; gills broad, distant, decurrent. Allied to *Panus laevis*. On oak stumps. New England, G. J. Sprague; Pennsylvania, Dr. Michener, Annals and Mag. N. H., October, 1859, Cent. N. A. F., No. 99; New York, Peck, 26th Rep., p. 66; on decaying wood of deciduous trees, Croghan, September. It is remarkable for its large size and the dense hairy covering of the pileus and stem. Minnesota, 1876, Johnson, August; Maryland, Banning. Name, *striga*, a swath, from character of pubescence.

4. *PANUS TOMENTOSUS*, Bundy.

Pileus 1'—1½' wide, rather fleshy, becoming tough, depressed, nearly plane in some specimens, subinfundibuliform, dull yellowish, merging into purple, tomentous, outer zone densely covered with tawny hairs; margins incurved; gills narrow, decurrent, white, at first tinged with purplish; stem excentric, short, thicker below, densely covered with tawny hairs, 1'—1½' high. Ironton, July, on oak logs. Geology of Wisconsin, Vol. I, p. 398, 1883. Name, *tomentum*, a stuffing for cushions (wool, hair, etc.), from the hairs on the pileus.

** 5. *PANUS STIPTICUS*, Fr.

Pileus ¾'—1' broad, cinnamon, becoming pale, acrid, thin, but not membranaceous, reniform, pruinose, the cuticle separating into furfuraceous scales; stem not reaching 1' long, solid, definitely lateral, compressed, dilated upwards, ascending, pruinose, paler than the gills; gills ending determinately (not decurrent), thin, very narrow, crowded, elegantly connected by veins, cinnamon; gregarious caespitose, remarkable for its astringent taste. The pileus sometimes has an infundibuliform appearance with lobes all round. On stumps; common. Reckoned poisonous spores obovoid-sphaeroid, 2—3 x 1—2 mk.:—3 x 4 mk. W. G. S. Stevenson, British Fungi, Vol. II, p. 160. This has been found in New England by C. J. Sprague; South Carolina, Ravenel; Amherst, Mass., C. C. Frost; Florida, Calkins; New York, Peck, 33d Rep., p. 36, who says it "usually occurs on trunks of deciduous trees, but occasionally it is found on hemlock trunks;" Ohio, Morgan; Kansas, Cragin; Louisiana, Langlois. Ellis has distributed it in his third Cent. N. A. F. It is very common. Name, *stipticus*, astringent.

6. *PANUS FARINACEUS*, Schum.

Pileus cinnamon-umber, somewhat coriaceous, flexuous, cuticle separating into whitish bluish-grey scurf; stem short, lateral, of the same color as the pileus; gills determinately free, distinct, paler. The habit is that of *P. stipticus*. Stevenson, British Fungi, Vol. II, p. 160. Morgan, the only American writer who mentions this species (Mycologic Flora Miami Valley, Ohio), writes: "The pileus is brown or blackish, with a dense white pubescence. What I have found grew out of the cracks in the hickory bark." Name, *farina*, meal, from the scurf on the pileus.

7. *PANUS LÆVIS*, B. & C.

Pileus 3' broad, orbicular, slightly depressed, white, clothed in the center with long, intricate, villous, rather delicate hairs, which are shorter and more matted towards the inflected margin, substance rather thin; stipe 3' long, ½' thick, attenuated upwards, generally excentric, sometimes lateral, not rooting, solid, strigose below, closely villous like the margin of pileus; gills rather broad, entire, decurrent, but not to a great degree; the interstices even above, behind clothed with the same coat as the top of the stem; spores white. A most distinct species, remarkable for its great lightness when dry and the long villous but not compressed, compound flocci of the pileus. Sometimes the center of the pileus be-

comes quite smooth when old. Trunks, South Carolina, Curtis, Annals and Mag. N. H., December, 1853. Cent. N. A. F., No. 33. New York, oak stumps, Wading River, September, Peck, 33d Rep., p. 21, writes: "The margin of the pileus is sometimes marked by small, oblique elevations or ridges which unite inwardly and thus form, with the edge of the pileus, small triangular spaces. Sometimes the two elevated lines which form the sides of a triangle divide near the margin and thus form two very small additional triangles. The pure white color and regular, even pileus make this a very pretty species. The color, however, becomes slightly tinged with yellow in drying. Name, *levis*, smooth.

8. *PANUS DEALBATUS*, Berk.

Pileus three-quarters of an inch broad, flabelliform, sometimes lobed; when moist, tough and flexible, umber-brown, striate; when dry, white and minutely cracked, as if whitewashed, with a dark border; stem quarter of an inch or more high, dilated upwards, compressed and often canal-iculate, perfectly lateral, of the same color and texture as the pileus; gills narrower, umber-brown, distinct, without any veins in the inter-stices, decurrent and clothed below with a white stratum; when dry, brown, with a white edge. Allied to *A. farinaceus*, Schum., but at once distinguished by its very decurrent gills. There are few prettier fungi than this when dry. Sometimes the stem is forked and each division produces a distinct pileus. (Des. New Species Fungi, etc., Thomas G. Lea, Cincinnati, 1849.) This fungus was discovered by Mr. Lea, on a dry dead branch, Waynesville, Ohio, Aug. 26, 1844; South Carolina, Curtis; Ohio, Morgan (Miami Valley) on branches of elm; New York, Peck, 33d Rep., p. 21; decaying wood of deciduous trees, Vernon, August. Name, *de-albo*, to whitewash, from appearance of pileus when dry.

9. *PANUS FŒTENS*, Secr.

Pileus pliant, spongy, spathelike, convex-depressed, somewhat silky, dirty white, stretched out behind into a long stem, the upper part of which is channelled; gills decurrent, firm, pressed together, flesh yellow, odor fœtid; stem $1\frac{1}{2}$ ' long, 4" thick; pileus $2\frac{1}{2}$ ' broad. On pine trunks. Fr. Hym. Eur., p. 489. Name, *fœtor*, a stench, from the smell. This species is mentioned only by M. A. Curtis, who found it on dead wood in South Carolina.

*** 10. *PANUS DORSALIS*, Bosc.

Pileus, $1\frac{1}{2}$ '—3' broad, fleshy coriaceous, at first resupinate, afterwards expanded, sessile, somewhat reniform, tomentose, luteous, expallent, often imbricate and sessile or sometimes slightly stipitate; gills broad, rather distant, orange tawny; spores same color. On stumps and trunks. North and South Carolina, autumn and winter, dead pines. M. A. Curtis; South Carolina, winter, dead trunks of pine, Ravenel; Ohio, Morgan. The latter writes: "This I have no doubt is the same plant as *Agaricus nidulans*, Fr. I have observed it carefully in every stage and it agrees perfectly with the figure and description of Fries' *Icones*, except the substance is leathery and persistent, not putrescent." (Mycologic Flora

of Miami Valley, Ohio.) Bosc described this plant in the Berlin Magazine, 1811. Massachusetts, C. J. Sprague, Pro. B. S. N. H.; Florida, W. W. Calkins, JOURN. MYCOL., Vol II, p. 28; New York, C. H. Peck, Reports Botanist, 22d, p. 81, 30th, p. 71. Peck writes: "The form which occurs here does not agree with the description of the species. It has no stem and is of a buff or pale yellow color. The cuticle does not break up into floccose scales, but the pileus is strigose hairy, especially toward the margin. The spores are of a beautiful fleshy-pink color like the lamellæ of young *Agaricus campestris*. It grows on beech and birch. I have not found it on pine. If the type is accurately described, our plant ought at least to be considered a distinct variety." Ellis has distributed this species in N. A. F., No. 912. Name, *dorsum*, the back, from it first being resupinate.

11. *PANUS ANGUSTATUS*, Berk.

Pileus about one inch long, coriaceo-submembranaceous, spatulate or flabelliform, narrowed behind, white, dirty white or yellowish, most minutely pubescent; upper stratum gelatinous; stem extremely short, being in fact little more than a continuation of the pileus; gills very narrow, close, decurrent, white, very minutely pubescent, yellowish when dry. Somewhat resembling *Panus copulatus*. Discovered by Mr. Thos. G. Lea on a dead log, Waynesville, Ohio, Sept. 10, 1841, Catalogue Plants of Cincinnati, 1849; South Carolina, M. A. Curtis; Morgan (Mycologic Flora of Miami Valley, Ohio) says it is common on old logs in woods. Name, *angustus*, narrow, from its pileus being narrowed behind.

12. *PANUS ALLIACEUS*, B. & C.

Small, strongly alliaceous, highly offensive; pileus 2' or more across, stemless, suborbicular, at length slightly elongated, minutely tomentose behind, more distinctly so in front, where it is sometimes rather scabrous and hispid, dirty white, inclining to tawny or yellow, especially towards the edge; often more or less effused behind; gills of the same color as the pileus, distant, entire, moderately broad, attenuated behind, interstices even; spores white, with a very slight yellow tinge, minute, oblong, strongly curved. A fine species allied to *P. foetens*, but without the least trace of a stem. The curved spores are very remarkable. In the young plant the pileus is nearly resupinate. On the putrescent stumps apparently of *Nyssa*, Curtis; also on *Salix nigra*, Ravenel, Annals and Mag. N. H., December, 1853, Cent. N. A. F., No. 34. Name, *allium*, garlic, from the smell.

13. *PANUS OPERCULATUS*, B. & C.

Fasciculate, erumpent; pileus cup-shaped, one-half inch or more across, fixed by the apex, rufous, clothed with a scurfy pubescence, which at length vanishes; gills narrower, of the same color as the pileus, at first covered by a tympanoid veil. South Carolina, Curtis; New England, on bark, D. Murray. Allied to *P. Delastrii*, Mont. Annals and Mag. N. H., October, 1859, Cent. N. A. F., No. 100; New England, C. J. Sprague, Pro. B. S. N. H.; C. C. Frost, Cat. Plants, etc., Amherst College; New York, C. H. Peck, Rep. 27, p. 97, Rep. 30, p. 71, "not rare on

alder trunks and branches, the veil or operculum is very fugacious, so that it is rarely seen except on very young plants." Name, *operculo*, to cover, from being first covered by a veil.

14. PANUS SALICINUS, Peck.

Pileus 4"—6" broad, firm, thin, convex, deflexed or subpendant, hygrophanous, minutely farinaceo-tomentose, pinkish-grey; gills moderately broad and close, converging to an excentric point, dark ferruginous; stem very short or obsolete, obliquely attached to the vertex of the pileus; plant gregarious. Trunks of dead willows, *Salix discolor*, Center, N. Y.; 24th Rep., p. 77-78; Minnesota, Johnson, September and October. Name, *salix*, willow tree, from its habitat.

NEW KANSAS FUNGI.

BY J. B. ELLIS AND W. A. KELLERMAN.

VERMICULARIA SPARSIPILA, E. & K.—On living leaves of *Callirrhoe involucrata*, Rooks Co., Kansas. Leg. Mr. E. Bartholomew, No. 25. On dirty brown irregular-shaped spots $\frac{1}{2}$ —1 cm. in diameter; perithecia epiphyllous, erumpent, pale, 75 μ in diameter, subastomous, thickly scattered over the spots and sparingly clothed with a few (2—6) erect, dark brown, continuous hairs, 40—60 x 5 μ , arising mostly from near the vertex; sporules oblong-elliptical, 2-nucleate, 18—20 x 5—6 μ , hyaline, ends obtuse. *Aecidium tuberculatum*, E. & K., occurs on the same leaves.

AECIDIUM TUBERCVLATUM, E. & K.—On leaves of *Callirrhoe involucrata*, Rooks Co., Kans. Leg. E. Bartholomew, No. 25. Amphigenous but more abundant below, springing from the midrib and nerves of the leaf, but without any definite spots; æcidia at first tubercular-hemispherical, $\frac{1}{2}$ — $\frac{3}{4}$ mm. in diameter and closed, then open and cup-shaped, with the margin slightly toothed; spores deep orange-yellow, variable in size and shape, subglobose, 18—20 μ to subelliptical, oblong or ovate, 20—27 x 18—23 μ . This is quite distinct from *Aecidium Callirrhoe*s, E. & K., which is on definite spots with smaller æcidia.

PHLEOSPORA CHENOPODII, E. & K.—On leaves of *Chenopodium album*, Manhattan, Kans., May, 1887. Kellerman & Swingle, No. 1187. Spots amphigenous, suborbicular, $\frac{1}{4}$ — $\frac{1}{2}$ cm. in diameter, pale rusty brown, with a raised greenish margin and more or less concentrically wrinkled; perithecia amphigenous, erumpent-superficial, black, rather large, scattered, only imperfectly developed, the lower part nearly obsolete, broadly perforated above; sporules oblong-cylindrical, obtuse at each end, 3-septate, pale brownish, constricted at the septa, 20—35 (mostly 20—25) x 8—11 μ . This is quite distinct from *Septoria Chenopodii*, West., which has much narrower (and according to our European specimens) continuous sporules.